

What is claimed is:

1. A semiconductor device, comprising:
a plurality of capacitor plugs formed within a
predetermined interval interleaved between two bit lines
5 and midpoints of capacitor plugs are located at inter-
section points of X axis virtual line and Y axis virtual
line, wherein the X axis virtual lines are parallel with
the bit lines and the Y axis virtual lines are vertical to
the X axis virtual lines; and
10 a plurality of lower electrodes of capacitors
formed within a predetermined interval to be respectively
connected with the capacitor plugs in one to one
correspondence,
each lower electrode being octagonally or
15 circularly shaped.

2. The semiconductor device as recited in
claim 1, wherein a lower electrode and neighbored lower
electrode in a direction of Y virtual axis line are formed
20 not to have overlapped area, if one of lower electrode is
moved to same X virtual axis line as the other lower
electrode.

3. The semiconductor device as recited in
25 claim 1, wherein the lower electrode and neighbored lower
electrode in a direction of Y virtual axis are not on the
same Y virtual axis.

4. The semiconductor device as recited in
30 claim 1, wherein the midpoints of the lower electrode and
the neighbored lower electrode are not on the same Y
virtual axis.

5. The semiconductor device as recited in claim 1, wherein a ratio of a major axis to a minor axis of the upper plane of the lower electrodes ranges from about 1 to 1 to about 2 to 1.

6. The semiconductor device as recited in claim 1, wherein an area of an upper plane of the lower electrode is practically identical to that of an lower plane of the lower electrode in view of a three-dimensional structure and the lower electrode features a octagonal or a circular cylinder structure having a lateral plane connecting the upper plane with the lower plane, wherein the lateral plane is substantially vertical to the upper plane and lower plane respectively.

7. The semiconductor device as recited in claim 1, wherein a plurality of contact pads are formed between the lower electrodes and the capacitor plugs, wherein the contact pads are formed over the capacitor plugs and disposed at a lower plane of at least one of the paired lower electrodes.

8. The semiconductor device as recited in claim 7, wherein a midpoint of the contact pad is located at an upper plane of the capacitor plug along one of two X virtual axes which is adjacent to each other.

9. The semiconductor device as recited in claim 8, wherein a midpoint of the contact pad is deviated from the midpoint of a corresponding capacitor plug but located at a midpoint of the corresponding lower electrode.

10. The semiconductor device as recited in claim 8, wherein a midpoint of the contact pad is located at a midpoint of the corresponding lower electrode and the lower electrode corresponding to the contact pad and another lower electrode which is adjacent to the lower electrode corresponding to the contact pad along the Y virtual axis are disposed at positions deviated from the Y virtual axis in an opposite direction.

11. The semiconductor device as recited in claim 8, wherein size of the upper plane of the contact pad is greater than that of the upper plane of the capacitor plug.

12. A method for fabricating a semiconductor device, comprising:

a) forming a plurality of capacitor plugs within a predetermined interval interleaved between two bit lines by arranging midpoints of capacitor plugs located at intersection points of X axis virtual line and Y axis virtual line, wherein the X axis virtual lines are parallel with the bit lines and the Y axis virtual lines are vertical to the X axis virtual lines; and

b) forming a plurality of lower electrodes of capacitors within a predetermined interval to be respectively connected with the capacitor plugs in one to one correspondence, each lower electrode being octagonally or circularly shaped.

13. The method as recited in claim 12, wherein part step b) further comprises:

b-1) depositing a sacrifice insulation layer over the capacitor plug formed over a semiconductor substrate;

5 b-2) forming a plurality of open parts exposing the capacitor plugs by performing an selective etching of the sacrifice insulation layer by using a mask pattern;

b-3) depositing a material for the lower electrode on an entire profile of the semiconductor
10 substrate comprising the open parts;

b-4) forming the lower electrodes separated from each other by performing a planerization process until the sacrifice insulation layer is exposed; and

b-5) removing the sacrifice insulation layer by
15 carrying out a wet dip-out process.

14. The method as recited in claim 13, wherein the mask pattern having an open part and neighbored open part in a direction of the Y virtual axis line are formed
20 not to have overlapped area or to have minimum overlapped area, if the open part is moved to the same X virtual axis line as the other open part.

15. The method as recited in claim 14, wherein
25 the mask pattern having the open part and neighbored open part in a direction of the Y virtual axis are not on the same Y virtual axis.

16. The method as recited in claim 14, wherein
30 the mask pattern having the open part and the neighbored open part are not on the same Y virtual axis.

17. The method as recited in claim 14, wherein the open part of the mask pattern features an octagonal or a circular shape and a ratio of a major axis to a minor axis of the open part ranges from about 1 to 1 to about 2 to 1.

18. The method as recited in claim 12, wherein an area of an upper plane of the lower electrode is practically identical to that of an lower plane of the lower electrode and the lower electrode has an octagonal or circular cylinder structure which has a lateral plane connecting the upper plane with the lower plane and practically vertical to the upper plane and lower plane.

19. The method as recited in claim 12, wherein a plurality of contact pads are respectively formed between the lower electrodes and the capacitor plugs after forming the capacitor plugs, wherein the contact pads serve as connecting the lower electrode with the capacitor plug electrically.

20. The method as recited in claim 19, wherein the contact pads are formed over the capacitor plugs and midpoints of the contact pads are located at a lower plane of at least one of the paired lower electrodes along the X virtual axis.

21. The method as recited in claim 19, wherein the contact pads are disposed on upper planes of the capacitor plugs of which midpoints are located along one of a pair of X virtual axes adjacent to each other.

22. The method as recited in claim 20, wherein the midpoints of the contact pads are deviated from the midpoints of corresponding capacitor plugs and respectively located at midpoints of corresponding lower electrodes.

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23. The method as recited in claim 20, wherein a midpoint of the contact pad is located at a midpoint of the corresponding lower electrode and the lower electrode corresponding to the contact pad and an adjacent lower
10 electrode found along the Y virtual axis are disposed in a way crossing each other.

24. The method as recited in claim 20, wherein size of the upper plane of the contact pad is greater than
15 that of the upper plane of the capacitor plug.